

We Claim:

1. A method for producing a reflective mirror for the lithographic exposure of semiconductor products, which comprises the following steps:

forming a multilayer structure on a substrate;

producing a capping layer above the multilayer structure from a doped material on which a natural oxide layer forms in air; and

bringing the capping layer into contact with hydrogen peroxide resulting in an artificially grown oxide layer forming on the capping layer.

2. The method according to claim 1, which further comprises carrying out the step of bringing the capping layer into contact with hydrogen peroxide by dipping the capping layer into hydrogen peroxide having a concentration of between 10% and 50% for a time duration of between 3 and 120 minutes.

3. The method according to claim 2, which further comprises heating the hydrogen peroxide before immersion of the capping layer.

4. The method according to claim 2, which further comprises heating the hydrogen peroxide during immersion of the capping layer.
5. The method according to claim 2, which further comprises heating the hydrogen peroxide before and during immersion of the capping layer.
6. The method according to claim 1, which further comprises producing the capping layer with a layer thickness of between 0.8 and 2.0 nm through the contact with hydrogen peroxide.
7. The method according to claim 1, which further comprises choosing a concentration magnitude of a doping of the doped material to cause a natural oxide growth on the oxide layer grown with the aid of hydrogen peroxide to be annually less than 10% of a layer thickness grown with the aid of hydrogen peroxide.
8. The method according to claim 1, which further comprises producing the capping layer from an n-doped material.
9. The method according to claim 8, which further comprises applying the capping layer through the use of a deposition, and introducing an n-type doping into the capping layer during the deposition.

10. The method according to claim 1, which further comprises producing the capping layer from doped silicon.

11. A reflective optical mirror for the lithographic exposure of semiconductor products, the mirror comprising:

a substrate;

a multilayer structure disposed above said substrate for reflecting electromagnetic radiation through constructive interference; and

a capping layer disposed above said multilayer structure, said capping layer formed of a material on which a natural oxide layer forms in air, said material of said capping layer being doped with a doping and said oxide layer including a region having a layer thickness with the same doping as said doping of said capping layer being incorporated into an oxide of said oxide layer.

12. The reflective mirror according to claim 11, wherein said layer thickness of said oxide layer is between 0.8 and 2.0 nm.

13. The reflective mirror according to claim 11, wherein said capping layer is formed of n-doped silicon.

14. The reflective mirror according to claim 11, wherein said capping layer is doped with a material selected from the group consisting of phosphorus and arsenic.

15. The reflective mirror according to claim 11, wherein said capping layer is amorphous.

16. The reflective mirror according to claim 1, which further comprises a patterned mask layer for patterning a semiconductor product.

17. The reflective mirror according to claim 16, wherein said patterned mask layer is disposed above said capping layer.

18. The reflective mirror according to claim 11, wherein said multilayer structure is dimensioned to cause electromagnetic radiation having a wavelength greater than 1 nm and less than 100 nm to be reflected.